

Upper Airway Obstruction

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<http://www.geocities.com/jonesapjr/index.html>

Learning Objective

- ^ Describe the etiologies, pathophysiology, manifestations, diagnostic procedures and management of upper airway obstructive conditions.

Etiologies

Upper vs. peripheral airways

- ^ Upper airways- mouth to carina
 - ◆ intrathoracic- from carina to vocal cords
 - ◆ extrathoracic- superior to vocal cords

Upper vs. peripheral airways

- ^ Upper airway categories
 - ◆ supraglottic- above the true cords
 - ◆ intraglottic- involving the true vocal cords
 - ◆ infraglottic- below the true cords and above the carina

Foreign Body Aspiration

- ^ children
- ^ intoxicated patients
- ^ stroke patients- impaired swallowing

Edema

- ^infections
 - ◆croup
 - ◆epiglottitis
 - ◆tonsillitis
 - ◆diphtheria

Edema

- ^angioedema
 - ◆rapid swelling of mucosa, submucosa and skin
 - ◆commonly associated with anaphylaxis

Edema

- ^angioedema- agents
 - ◆radiocontrast agents
 - ◆opiates
 - ◆aspirin
 - ◆NSAIDs

Edema

- ^angioedema- agents
 - ◆ACE inhibitors
 - f lisinopril (Zestril, Prinivil)
 - f enalapril (Vasotec)
 - f captopril (Capoten)

Link to article on ACE inhibitors and angioedema
<http://www.chestjournal.org/cgi/content/full/126/2/400>

Edema

- ^post-extubation tracheitis
- ^anaphylaxis- angioedema
 - ◆medications; penicillin
 - ◆insect stings; bees, wasps
 - ◆food allergies; peanuts, sea food
 - ◆animal dander; feline

Link to article on post-extubation stridor
<http://www.cefir.com.br/artigos/79.pdf>

Edema

- ^inhalation injury
 - ◆burns- thermal injury
 - ◆smoke- numerous irritants
 - ◆noxious inhalants; e.g., chlorine gas

Anatomic

- ▲ **Congenital airway anomalies**
 - ◆ micrognathia (small mandible)
 - ◆ macroglossia (large tongue)
 - ◆ laryngeal web
 - ◆ vascular ring
 - ◆ vocal cord dysfunction (may be acquired)

Link to video on laryngeal web
<http://www.veoh.com/videos/v827539mcFwtDjG>

Anatomic

- ▲ **Acquired conditions**
 - ◆ trauma- laryngeal fractures
 - ◆ neoplasm- tumors
 - ◆ hematoma- line insertion
 - ◆ CNS depression- relaxation of muscles controlling airways

Anatomic

- ▲ **Acquired conditions**
 - ◆ iatrogenic- intubation, tube cuffs
 - f* tracheal stenosis
 - f* vocal cord paralysis

Click for image of tracheal stenosis
<http://www.emedicine.com/radio/images/336139-352740-362175-362263.jpg>

Click for video of tracheal stenosis
<http://www.emedicine.com/radio/images/336139-352740-362175-362288.wmv>

Anatomic

- ▲ **laryngospasm**
 - ◆ uncontrolled/involuntary muscular contraction of the laryngeal cords
 - ◆ duration usually less than one minute
 - ◆ complication of intubation, extubation, GERD

Click for video of laryngospasm
<http://www.voicedoctor.net/media/video/laryngospasm/laryngospasm movie.html>
 Click for humorous video by the Laryngospasms
http://www.youtube.com/watch?v=kP2OuZ_vl_s

Anatomic

- ▲ **vocal cord dysfunction**
 - ◆ paradoxical vocal cord adduction during inspiration
 - ◆ often mistaken for asthma, with inappropriate therapy administered
 - ◆ very important to respiratory therapists

Anatomic

- ▲ **vocal cord dysfunction**
 - ◆ etiologies
 - f* congenital, idiopathic
 - f* cortical injury
 - f* brainstem compression
 - f* psychopathology
 - f* malingering- can be voluntary
 - f* irritant-induced; e.g., at workplace

Link to review on vocal cord dysfunction
<http://www.utmb.edu/otoref/Grnds/Vocal-Cord-2001-07/VCD-2.htm>

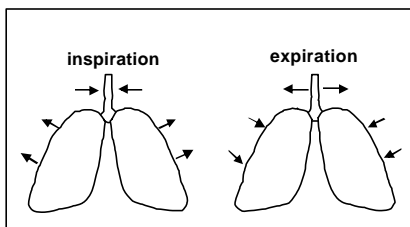
Pathophysiology

Upper vs. peripheral airways

^ Upper airways

- ◆ intrathoracic- from carina to vocal cords are expanded by inspiration and compressed by expiration.
- ◆ extrathoracic- superior to vocal cords are collapsed by inspiration and expanded by expiration.

Upper vs. peripheral airways



Upper vs. peripheral airways

^ Upper airway obstruction

- ◆ inspiration more vulnerable to obstruction
- ◆ turbulent flow predominates in larger airways
 - f* additional source of resistance
 - f* rationale for Heliox, which reduces resistance to flow in turbulence

Link to article on upper airway pathophysiology
http://www.aic.cuhk.edu.hk/web8/upper_airway_obstruction.htm

Manifestations

History

^ Chronic symptoms

- ◆ may be exercise-induced
- ◆ may be exacerbated by work environment
- ◆ dyspnea
- ◆ cough
- ◆ hoarseness

History

- ▲ **Medical history**
 - ◆ previous treatment for asthma (misdiagnosed)
 - ◆ sleep apnea
 - ◆ intubation, tracheostomy
 - ◆ allergies
 - ◆ psychiatric illness
 - ◆ upper respiratory infections

History

- ▲ **Occupational exposure**
 - ◆ allergens
 - ◆ inhalants

Physical Examination

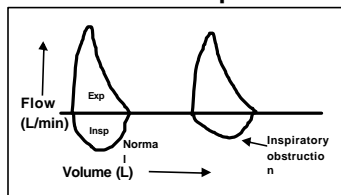
- ▲ **Mild to moderate**
 - ◆ dysphonia (hoarseness)
 - ◆ stridor
 - ◆ wheezing- may be referred from neck

Physical Examination

- ▲ **Severe**
 - ◆ inspiratory retractions
 - ◆ dysphagia, drooling
 - ◆ stridor
 - ◆ abdominal paradox (fatigue)
 - ◆ cyanosis

Pulmonary Function Testing

- ▲ decreased inspiratory flow or
- ▲ decreased inspiratory and expiratory flow
- ▲ no bronchodilator response



Other Diagnostic Techniques

- ▲ imaging- radiographs, CT scans
- ▲ laryngoscopy
- ▲ bronchoscopy

Management

Impending ventilatory failure:

- ^ heliox- reduces resistance by decreasing gas density
 - ◆ can provide immediate relief
 - ◆ temporary measure
- ^ endotracheal intubation
- ^ cricothyrotomy
- ^ tracheotomy

Foreign body aspiration

- ^ Removal of aspirate, assisted by:
 - ◆ laryngoscopy
 - ◆ bronchoscopy

Infections

- ^ epiglottitis
 - ◆ extreme caution
 - ◆ antibiotics
 - ◆ intubation
 - ◆ sedation
 - ◆ wait for antibiotics to work

Infections

- ^ croup
 - ◆ inhaled racemic epinephrine
 - ◆ inhaled steroids (budesonide)
 - ◆ mist therapy- no effects
- ^ chronic tonsillitis
 - ◆ antibiotics
 - ◆ tonsillectomy

Link to article on budesonide and croup
<http://content.nejm.org/cgi/content/full/331/5/285>

Edema

- ^ allergic (anaphylaxis)
 - ◆ epinephrine
 - ◆ diphenhydramine (Benadryl)
 - ◆ steroids
 - ◆ beta-agonist (albuterol)

Edema

- ^ post-extubation tracheitis
 - ◆ inhaled racemic epinephrine???
 - ◆ inhaled alpha adrenergic; e.g., neosynephrine?? (no research)
 - ◆ inhaled steroids
 - ◆ systemic steroids
 - ◆ heliox

Inhalation injury

- ^ racemic epinephrine
- ^ steroids
- ^ beta-adrenergics- for accompanying bronchospasm
- ^ heliox

Link to article on heliox in critical care
<http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1794472>

Vocal cord dysfunction

- ^ Helium-oxygen therapy- severe exacerbations
- ^ Anticholinergic aerosol may be effective for exercised-induced VCD
- ^ CPAP

Vocal cord dysfunction

- ^ Removal from exposures, if there is environmental cause
- ^ Speech therapy
 - ◆ education about condition
 - ◆ breathing exercises, panting
- ^ Psychotherapy
- ^ Sedatives, anxiolytics

Neoplasms, congenital anomalies, trauma, hematoma

- ^ heliox until surgery is completed
- ^ cricothyrotomy
- ^ surgical resection

Acquired tracheal stenosis

- ^ stent placement

Click to see stents and placement
<http://www.pulm.vcu.edu/stents.html>